

3.3.4.5 Dry Cliff

3.3.4.5.1 Community Overview

In most of Wisconsin the bedrock is buried beneath glacial materials that were deposited during the Pleistocene Ice Age. In glaciated regions, cliffs are associated with certain stretches of the Great Lakes coasts, stream-carved gorges, and the vestigial remnants of ancient, eroded mountain ranges and escarpments. In the “Driftless Area” of southwestern Wisconsin the mantle of glacial drift is absent and erosion has exposed sedimentary bedrock of Paleozoic age at many locations, most often as a linear series of vertical cliffs.

By definition, a cliff is a geologic feature, not a plant community, which can occur on virtually any rock type. Rock type, exposure, surrounding land cover and other factors create a wide variety of environmental conditions that may influence species composition. The presence or absence of fractures and other features that may hold soil particles and moisture, or the alternation of strata composed of different rock types that have different properties, can affect habitat suitability for plants and animals.

A greater proportion of limestone (dolomite) cliff sites tend to be dry, compared to sandstone cliff sites, due to the potential for capillary action in sandstone to hold and slowly transport the water that is essential for plant survival. A soil profile is generally absent, or may occur as localized, usually thin deposits on ledges or in cracks. Dry cliffs may be influenced by aspect, local hydrology, or the proximity of waterbodies. Series of dry cliffs may include stretches or patches that are moist, and these often support additional species. The separation of “dry” from “moist” cliffs can be somewhat artificial, and the totality of the environment should be considered when assessing conservation values and opportunities.

Dry cliff communities occur on many different rock types, and vary in species composition. Scattered pines, oaks, cedars, and drought-adapted shrubs such as bush honeysuckle and huckleberry, often occur on the margins of the exposed rock, or where mineral soil has accumulated on ledges or in fissures. Floristic homogeneity between cliffs is typically rather low, but representative herbs may include the ferns common polypody, smooth cliff brake, rusty woodsia, and northern fragile fern, along with columbine, harebell, sand cress, sleepy catchfly, pale corydalis, and rock spikemoss. Dry cliffs are frequently colonized by crustose lichens, which may be the most common inhabitants of bare rock environments for decades or even centuries.

Plant species composition is strongly influenced by the plant community in the immediate vicinity of the cliff, but also includes bare rock specialists, among which are some of Wisconsin's most dramatic examples of disjunct species. An example of a disjunct species is the population of Lapland rose-bay that grows on a sandstone cliff along the Wisconsin River in the Central Sand Plains. One other population of this species is known from Wisconsin, but the next closest population is on an Adirondack mountaintop in rural New York.

Cliffs are used for denning and roosting by mammals, for nesting and roosting by birds, as hibernacula by herptiles, and also provide suitable conditions for specialized invertebrates. Besides insects, the latter group includes several very rare terrestrial gastropods.

3.3.4.5.2 Vertebrate Species of Greatest Conservation Need Associated with Dry Cliff

Six vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with dry cliff (Table 3-102).

Table 3-102. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with dry cliff communities.

<i>Species Significantly Associated with Dry Cliff</i>	
Birds	
Peregrine Falcon	
Herptiles	
Black Rat Snake	
Bullsnake	
Timber Rattlesnake	
<i>Species Moderately Associated with Dry Cliff</i>	
Herptiles	
Northern Prairie Skink	
Yellow-bellied Racer	




In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-102 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both dry cliff and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of dry cliff in each of the Ecological Landscapes (Tables 3-103 and 3-104).
- Using the analysis described above, a species was further selected if it had both a significant association with dry cliff and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry cliff. These species are shown in Figure 3-19.

Table 3-103. Vertebrate Species of Greatest Conservation Need that are (or historically were) significantly associated with dry cliff communities and their association with Ecological Landscapes that support dry cliff.

Dry Cliff Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (1)*	Herptiles (3)		
	Peregrine Falcon	Black Rat Snake	Bullsnake	Timber Rattlesnake
MAJOR				
Central Lake Michigan Coastal				
Central Sand Plains				
Northern Lake Michigan Coastal				
Superior Coastal Plain				
Western Coulee and Ridges				
IMPORTANT				
Southwest Savanna				
Western Prairie				
PRESENT (MINOR)				
Central Sand Hills				
Southern Lake Michigan Coastal				

Color Key




-  = HIGH probability the species occurs in this Ecological Landscape
-  = MODERATE probability the species occurs in this Ecological Landscape
-  = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-104. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with dry cliff communities and their association with Ecological Landscapes that support dry cliff.

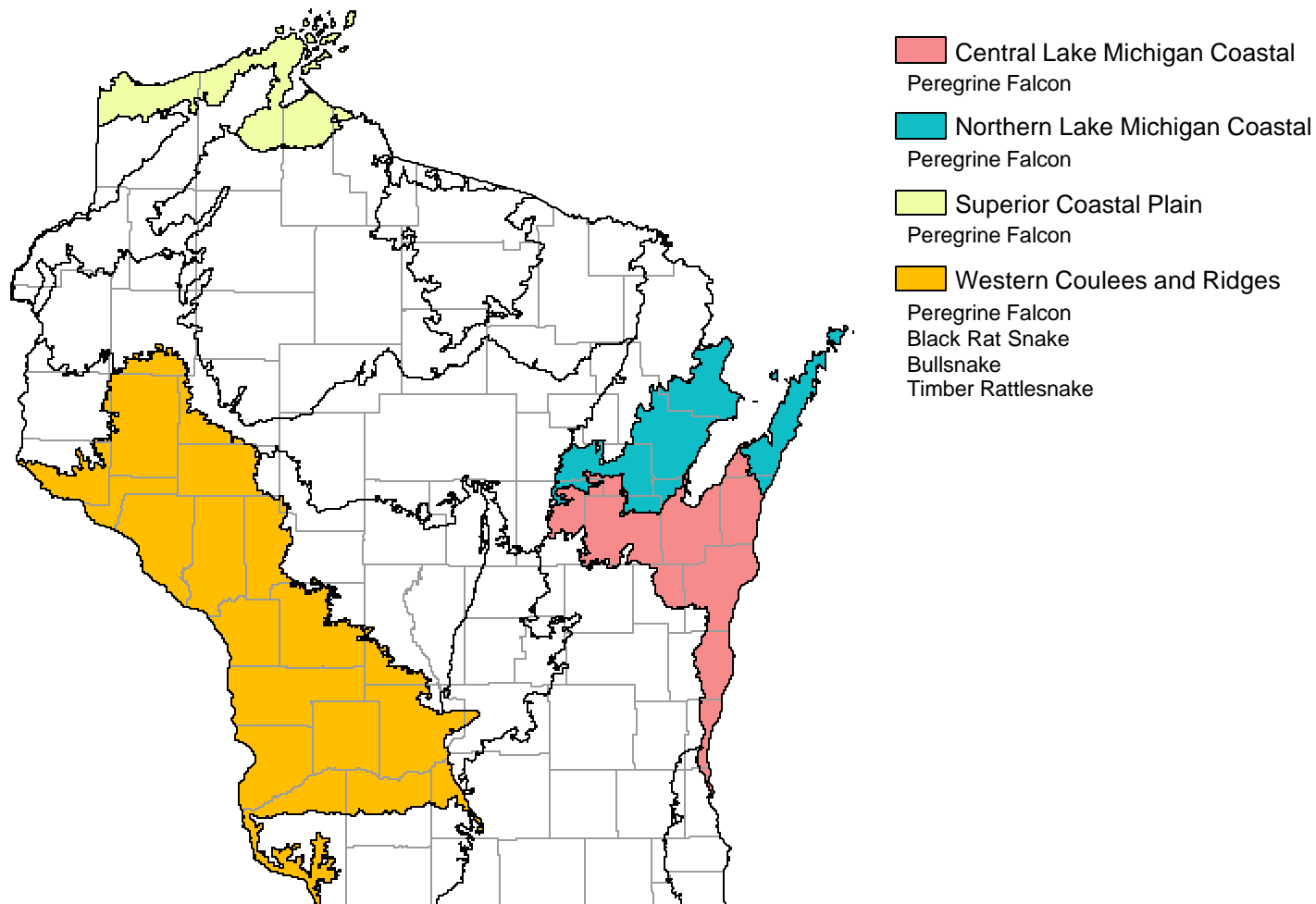
Dry Cliff	Herptiles (2)*	
	Northern Prairie Skink	Yellow-bellied Racer
Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type		
MAJOR		
Central Sand Plains		
Southeast Glacial Plains		
Western Coulee and Ridges		
IMPORTANT		
Forest Transition		
Southwest Savanna		
Western Prairie		
PRESENT (MINOR)		
Central Sand Hills		

Color Key

-  = HIGH probability the species occurs in this Ecological Landscape
-  = MODERATE probability the species occurs in this Ecological Landscape
-  = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-19. Vertebrate Species of Greatest Conservation Need that have both a significant association with dry cliff and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry cliff.



3.3.4.5.3 Threats and Priority Conservation Actions for Dry Cliff

3.3.4.5.3.1 Statewide Overview of Threats and Priority Conservation Actions for Dry Cliff

The following list of threats and priority conservation actions were identified for dry cliff in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.4.5.3.2 unless otherwise indicated.

Threats and Issues

- Quarrying by its nature destroys cliffs and the vegetation and microsites that are associated with them; however, quarrying operations can create new vertical rock faces.
- The construction of dams has led to the inundation of cliffs in some parts of the state, especially in the Western Coulees and Ridges Ecological Landscape.
- Grazing, fire, logging, road building, off-road vehicle use, home construction, and heavy foot traffic (specifically, rock climbing) can also be disruptive and degrade cliff habitats.
- The impacts of invasive species are unknown, but warrant further investigation.
- Some associated snail species are globally rare.
- The best sites outside of state parks are privately owned.

Priority Conservation Actions

- Additional surveys are needed to better establish the ecological values of cliffs in some parts of the state.
- Cliffs for which ecological values have been documented should be protected, and managed with care.
- Additional surveys are needed, especially for taxa that are poorly known (lichens, mosses, invertebrates), to clarify and establish the values of cliff habitats in many parts of the state.
- A better understanding of the effects that rock type, aspect, geographic location, total area of rock exposed, and landscape context have on cliff biota is needed to effectively address conservation needs and opportunities.
- Limit or avoid rock climbing and other disruptive activities on high-value sites.
- Landowner education may help guide extractive and high-impact recreational activities to areas of relatively low value.
- Protection of high-value sites should be encouraged, especially on privately owned lands.
- Surveys should be continued to search for additional sites of high conservation value.

3.3.4.5.3.2 Additional Considerations for Dry Cliff by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of dry cliff exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for dry cliff found in Section 3.3.4.5.3.1.

Additional Considerations for Dry Cliff in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Central Lake Michigan Coastal

Ecologically important stretches of the dolomitic Niagara Escarpment occur along the east side of the Fox River Valley, north of Lake Winnebago, and in northeastern Brown County, near Red Banks.

Central Sand Plains

Unglaciated exposures of Cambrian sandstones are uncommon but prominent features in this landscape, where they occur in association with eroded landforms such as ridges, mounds, knobs, and pinnacles, some of which are very unusual in the Midwest. Good examples occur at Mill Bluff State Park (Monroe County), in stream gorges and elsewhere on the Black River State Forest (Jackson County), and at Quincy Bluff and Wetlands State Natural Area (Adams County).

North Central Forest

Bedrock features are scarce and localized here except in the Penokee Range, on the landscape's northern fringe, where there are a number of dry cliffs and "balds" (bedrock glades). There are also a few cliff sites in the eastern part of the Ecological Landscape. Examples can be found on the Iron County Forest (basalt), along the Montreal River (also Iron County) and on the Chequamegon-Nicolet National Forest (e.g., McCaslin Mountain, a quartzite monadnock in Forest County).

Northern Lake Michigan Coastal

Cliffs of the dolomitic Niagara Escarpment are striking landscape features on the west side of the Door Peninsula. Examples can be found at Peninsula and Potawatomi State Parks, Ellison Bay Bluff State Natural Area, and Death's Door County Park.

Superior Coastal Plain

Wave-carved sandstone cliffs are found on rocky headlands along the northern margin of the Bayfield Peninsula, and along the coasts of some of the Apostle Islands (including North Twin Island and Stockton Island Cliffs). Separation of dry from wet cliffs is difficult, and perhaps artificial, as even the driest bedrock associated with the Lake Superior coast may be bathed in fogs or subject to wave spray during storms.

Western Coulee and Ridges

Sandstones and dolomites of Paleozoic age outcrop at many locations, most extensively in the valleys formed by large rivers such as the Mississippi, Wisconsin, Chippewa and Black. The many good examples include Ferry Bluff (Sauk County), the Kickapoo Reserve and Wildcat Mountain State Park (Vernon County), and Maiden Rock Bluff (Pepin County).

Additional Considerations for Dry Cliff in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Forest Transition

Rock outcroppings provide some cliff habitat in places such as the Dells of the Eau Claire River County Park, and Rib Mountain State Park, both in Marathon County.

Northeast Sands

Bedrock exposures are uncommon features in the Northeast Sands. They do occur along some of the high gradient streams in the landscape such as the Menominee and Peshtigo, and in association with isolated geologic rock features such as Butler Rock (Oconto County), Thunder Mountain (Marinette County), The Dalles of the Menominee River (Marinette County), and Hagar Mountain (Oconto County).

Southern Lake Michigan Coastal

The youngest bedrock exposures in Wisconsin are dolomites of Devonian age, which outcrop as low cliffs and ledges at a few locations near Lake Michigan. Examples may be seen at several locations within the Milwaukee County Park system, such as at Estabrook Park.

Southwest Savanna

Stream cut valleys expose Paleozoic sandstones and dolomites at sites such as Governor Dodge State Park, where the park's trail system permits close examination of the bedrock.

Western Prairie

Significant bedrock exposures of dolomite and sandstone occur at Kinnickinnic and Willow River State Parks, Apple River Canyon State Natural Area, and at locations in Polk County within the St. Croix-Namekagon National Scenic Riverway.